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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ENSEMB.023VP	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/29687	International filing date *(day/month/year)* 26/10/2000	Priority date *(day/month/year)* 29/10/1999

International Patent Classification (IPC) or national classification and IPC H04L12/28

Applicant ENSEMBLE COMMUNICATIONS, INC.

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

    ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

    These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

    I   ☒ Basis of the report
    II   ☐ Priority
    III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
    IV   ☒ Lack of unity of invention
    V   ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
    VI   ☐ Certain documents cited
    VII ☐ Certain defects in the international application
    VIII ☐ Certain observations on the international application

Date of submission of the demand 28/05/2001	Date of completion of this report 18.12.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Niculiu, R Telephone No. +49 89 2399 7437

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. **PCT/US00/29687**

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)):*
   Description, pages:

1-17	as originally filed

   Claims, No.:

1-12	as originally filed

   Drawings, sheets:

1/14-14/14	as originally filed

2. With regard to the **language,** all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description,   pages:

   ☐ the claims,   Nos.:

☐ the drawings,   sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

☐ restricted the claims.

☐ paid additional fees.

☐ paid additional fees under protest.

☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:
   see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☒ all parts.

☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1 - 12
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1 - 12
	No:	Claims	

Industrial applicability (IA)   Yes: Claims 1 - 12

No: Claims

2. Citations and explanations
   see separate sheet

Re Item IV

1.   The application **does not meet the requirements of unity** (Rule 13.1 PCT) for the following reasons:

1.1   Independent **claims 1, 10 and 11** deal with efficiently transporting data between the MAC and the physical layers in a wireless communication system. This is done by concatenation of two or more MAC packets into a single TC/PHY packet when the first MAC packet is shorter than the TC/PHY packet.

Independent **claim 12** deals with re-synchronisation of data in a wireless communication system. This is done by detecting a disruption of a communication link and, after reestablishing the communication, by detecting a header present field in the TC/PHY packet received.

1.2   Thus, the above two claim groups **comprise different features and are based on different concepts.**

1.3   The common part of the two claim groups relating to a wireless communication system is known in the art (see section V, point 1.1).

Re Item V

1.   The subject matter of claim 1 is new and involves an inventive step (Article 33 (2) and (3) PCT) for the following reasons:

1.1   **D1 = EP-A-0 622 924 (IBM) 2 November 1994 (1994-11-02),** which is considered to represent the most relevant state of the art, discloses the following features set out in claim 1 :
   ♦   a method of transporting data in a wireless communication system, wherein the wireless communication system includes a plurality of customer premise equipment (CPE) in communication with associated and corresponding base stations, and wherein the base stations maintain uplink and downlink sub-frame maps representative of bandwidth allocations in uplink and downlink communication links, and wherein the base stations each include an

associated and corresponding media access control (MAC) having a plurality
of MAC data messages, and wherein the MAC transports a MAC data
message through a MAC data packet that is mapped to at least one TC/PHY
packet in a layered data transport architecture
- obtaining a MAC data packet
- fragmenting the obtained MAC data packet and mapping a first fragment into
the first TC/PHY packet, and then mapping remaining fragments into
successive TC/PHY packets
- mapping the obtained MAC data packet into the first TC/PHY packet

The **subject-matter** of claim 1 therefore **differs** from this known document in that
it is determined whether there are sufficient available bits in a TC/PHY packet to
map a first MAC data packet, determining again if after the mapping of the first
MAC packet there are sufficient bits remaining in the TC/PHY packet and, if so,
mapping a next MAC packet within the first TC/PHY packet.

1.2 **The problem** to be solved by the present invention is therefore to efficiently
transport data between the MAC and the physical layers in a wireless
communication system.

1.3 **The solution** to this problem proposed in claim 1 of the present application, i.e. to
concatenate more MAC packets in a TC/PHY packet if no change in modulation
on the downlink and no change in the CPE on the uplink is determined, **is not
suggested by the prior art.**

D1 is directed to providing mobile computers with modems for cellular telephone
systems the ability to obtain various classes of data communication services,
voice service and the capability to take part in LANs. However, the MAC packets
are fragmented, a priori, into smaller packets of a **given length** and **there is no
determination of remaining bits** in a TC/PHY packet **and no concatenation** of
MAC packets into the same TC/PHY packet.

D2 = US-A-5 404 374 (MULLINS JEFFERY L ET AL) 4 April 1995 (1995-04-04), teaches a method for encoding a packet of data in a transmitting station and decoding the data in a receiving station. The MAC packets are segmented, a priori, into equal segments. Like in D1 there is **no determination of the remaining bits** in a TC/PHY packet **and no concatenation** of MAC packets.

D3 = WO 98 10568 A (AIRONET WIRELESS COMMUNICATION) 12 March 1998 (1998-03-12), discloses a method and an apparatus for improving the performance of a cellular communication system using direct sequence spread spectrum technique. However, like D1 and D2, it fails to teach the determination of remaining bits in a TC/PHY packet and the concatenation of more MAC packets in a TC/PHY packet.

2.   The above finding also applies to independent **claims 10 and 11** which correspond to claim 1.

3.   **Claims 2-9** are dependent on claim 1 and as such they **also meet the requirements of the PCT** with respect to novelty and inventive step.

4.   The subject matter of claim 12 is new and involves an inventive step (Article 33 (2) and (3) PCT) for the following reasons:

4.1   **D1 = EP-A-0 622 924 (IBM) 2 November 1994 (1994-11-02)**, which is considered to represent the most relevant state of the art, discloses the following features set out in claim 1 :
   ◆   a method of re-synchronizing data in a wireless communication system, wherein the wireless communication system includes a plurality of customer premise equipment (CPE) in communication with associated and corresponding base stations, and wherein the base stations maintain uplink and downlink sub- frame maps representative of bandwidth allocations in uplink and downlink communication links, and wherein the base stations each include an associated and corresponding media access control (MAC) having a plurality of MAC data messages, and wherein the MAC transports a MAC data message through a MAC data packet that is mapped to at least one TC/PHY packet in a layered data transport architecture

♦   wherein the TC/PHY packet includes a header present field and wherein at
      least one of the communication links may be intermittently disrupted during
      data transmission, comprising the steps of

♦   receiving a TC/PHY packet

The **subject-matter** of claim 12 therefore **differs** from this known document in
that a disruption is detected when it occurs, the communication link is
reestablished, the header present field of the TC/PHY packet is detected and the
data transmission is resumed if the present header field comprises a logical one.

4.2   **The problem** to be solved by the present invention is therefore to provide a
       method of re-synchronization in a wireless communication system.

4.3   **The solution** to this problem proposed in claim 12 of the present application, i.e.
       to detect a header present field and determine if it comprises a logical one, **is not
       suggested by the cited prior art.**

5.   The vague and imprecise statement in the description on page 10, lines 1-2; page
       13, lines 2-3 and page 17, lines 23-24 (...the **spirit** of the present invention...")
       implies that the subject-matter for which protection is sought may be different to
       that defined by the claims, thereby resulting in lack of clarity (Article 6 PCT) when
       used to interpret them (see also the PCT Guidelines, III - 4.3a).

6.   Independent **claims 1, 10 and 11 are unclear**, contrary to the provision of Article
       6 PCT, because they refer to a synchronizing method/apparatus/program, but
       there is no synchronizing related feature supporting this definition.